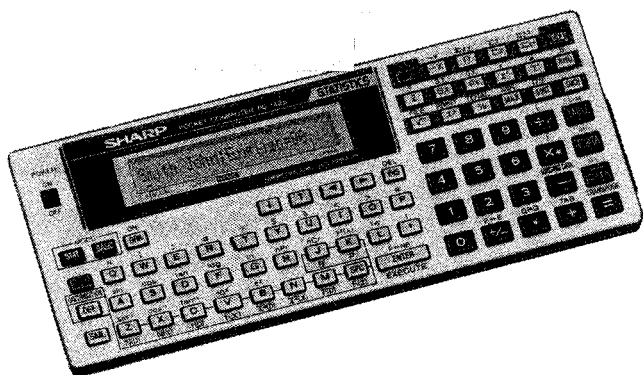


SHARP SERVICE MANUAL

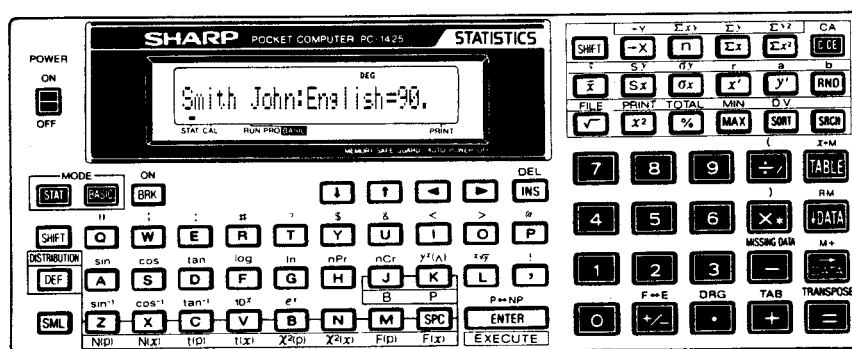
CODE: 00ZPC1425SM/E

MODEL PC-1425

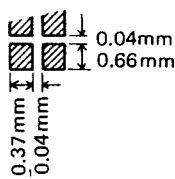


1. SPECIFICATIONS

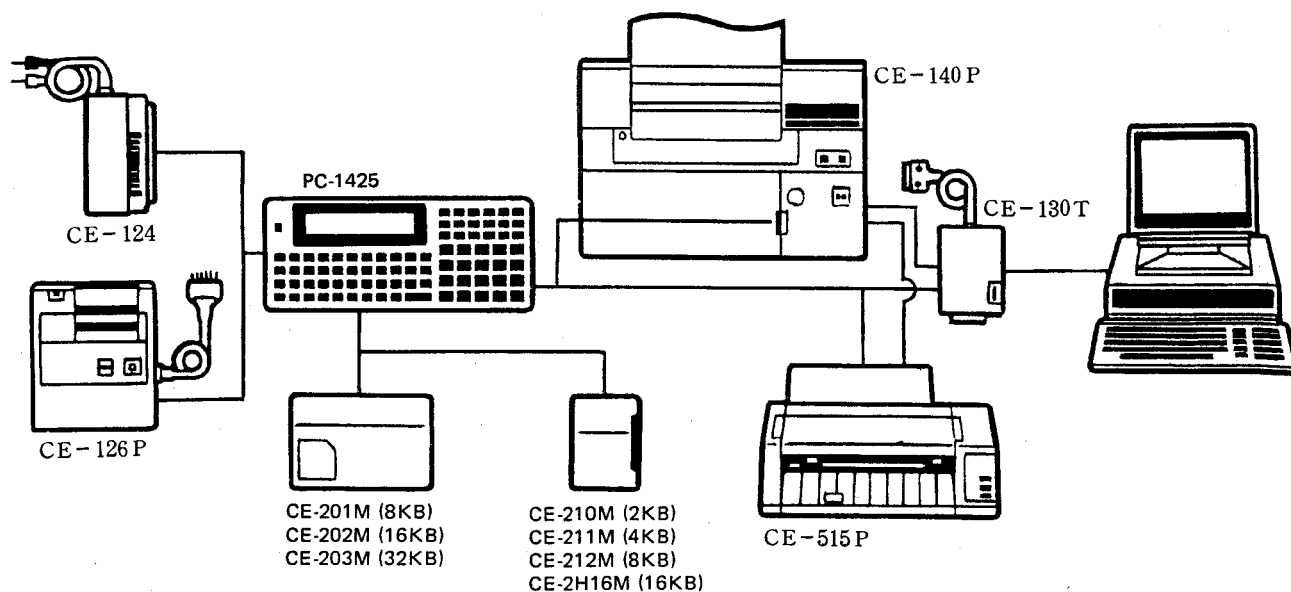
- Keyboard layout



- Model: PC-1425
- Arithmetic capacity: 10 digits (mantissa) + 2 digits (exponent)
- Arithmetic method: In order of mathematical expression (with priority determination function)
- Programming language: BASIC
- Microprocessor: CMOS 8-bit CPU
- System ROM: 136 Kilobytes (KB)
- Memory capacity: System Area:
 - Approx. 1.1 kilobytes (KB)
 - Data only area: 208(B)
 - Program/Data area: 6878 (B)
- Stack: Subroutine: 10 stacks
FOR-NEXT: 5 stacks
Function: 16 stacks
Data: 8 stacks
- Basic calculator functions: Fundamental:
 - Four math rulesFunctions:
 - Trigonometric and inverse trigonometric functions, logarithmic and exponential functions, angle conversion, square and square root, sign, absolute, integer, relational operators, logical operators.
- Editing functions: Horizontal cursor control (▶, ◀)
Insertion (INS)
Deletion (DEL)
Line up and down (↓, ↑)
- Serial I/O functions: Standards: Start-stop transmission (asynchronous) system.
Only half duplex.
Baud rates: 300, 600, 1200 Baud
Data bits: 7 or 8 Bits
Parity bits: Even, odd, or no-parity
Stop bit: 1 or 2 Bits
Connectors used: 15-pin connector (for external equipment)
Output signal level: CMOS level (4-6 Volts)
Interfacing signals: Inputs: RS, CS, CD, PAK
Outputs: SD, RS, RR, ER, PRQ
Others: SG, FG, VC
- Memory protection: Program, data, areas are backed up by battery during power off.

- **Display:** 24 characters Liquid Crystal Display with 5 x 7 dot characters.
Character size: 4.86(H) x 2.01(W) mm
Character pitch: 2.37 (1 dot space) mm
Dot size:  0.04mm x 0.04mm
- **Auto power off:** About 11 minutes
- **Operating temperature:** 0°C – 40°C (32°F – 104°F)
- **Power Supply:** 6V $\square$ (DC):
Lithium cells.
Type: CR-2032 x 2
- **Power Consumption:** 6.0V DC @ 0.03W
Approximately 120 hours, if operation is executed continuously at an operating temperature of 20°C. 10 minutes of program or calculation execution and 50 minutes of display time for one hour.
Actual time may vary slightly according to conditions.
- **Dimensions:** 182(W) x 72(D) x 16(H)mm.
7-5/23"(W) x 2-27/32"(D) x 5/8"(H)
- **Weight:** Approximately 175g (0.39 lbs.) with cells and RAM card.
- **Accessories:** Hard cover, two lithium cells (built-in), keyboard template, operation manual and RAM card (CE-212M).
- **Options:**
 - Example
 - CE-124: Cassette interface (CE-152, CE-127R ...)
 - CE-126P: Printer/Cassette interface
 - CE-210M: Plug-in card type 2KB RAM
 - CE-211M: Plug-in card type 4KB RAM
 - CE-212M: Plug-in card type 8KB RAM
 - CE-2H16M: Plug-in card type 16KB RAM
 - CE-201M: Plug-in card type 8KB RAM
 - CE-202M: Plug-in card type 16KB RAM
 - CE-203M: Plug-in card type 32KB RAM
 - CE-151P: Color plotting printer
 - CE-140P: Color dot printer
 - CE-516L: Connector cable for CE-515P
 - CE-130T: RS232C level converter etc.

2. SYSTEM CONFIGURATION



3. POWER CONSUMPTION

PC-1425 power supply	Lithium battery type CR-2032 x 2 pcs.	Capacity: 170mAh	Terminal voltage: About 6.0V
CE-212M	Lithium battery type CR-1616 x 1 pc.	Capacity: 50mAh	Terminal voltage: About 3.0V

Power consumed for the PC-1425 under power off	12 μ A, max.
Power consumed for the PC-1425 during displaying	416 μ A, max.
Power consumed for the PC-1425 during arithmetical operation	4.3mA, max.
Power consumed for the CE-212M	3 μ A, max.

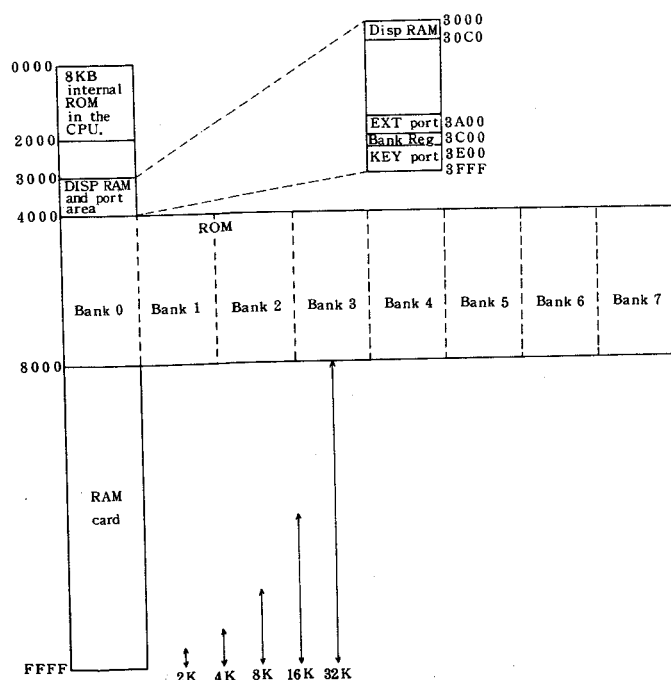
As the above values are observed under the room temperature of 20°C, it may vary depending on environment.

- How to judge the life of the battery

PC-1425: Needs replacement when the terminal voltage drops below 5.2 volts (2.6 volts per battery cell).

CE-212M: Needs replacement when the terminal voltage drops below 2.5 volts.

4. MEMORY MAP



5. CAUTIONS IN USING THE RAM CARD OPTION

- The set can't be operated without using any RAM card. If the power source is turned to ON without any RAM card, the lamp (*) glows at the right end of the display. Insert an RAM card after turning the power to OFF.
- Such data as variable, last answer memory, and independent memory (CAL mode) can be left in the card.
- The program and the data are cancelled when the battery of RAM card is changed (removed). If any important program is included, therefore, it is necessary to keep the program in a take in advance. It isn't possible to change the battery of RAM card while leaving a RAM card being mounted on the set. (CE-210M, 211M, 212M, 2H16M)
- If the reset switch is pushed without pressing the key, the program and the data in the RAM card are cleared.
- When the power is turned to ON after changing the battery of the body and attaching a RAM card, the program data in the RAM card is cleared. To keep the data in the RAM card, therefore, take the following procedure.
 - 1) Turn the power switch to OFF position.
 - 2) Take out the RAM card.
 - 3) Change the battery of the body.
 - 4) Turn ON the power switch.
 - 5) Make sure that the lamp (*) is on at the right end of the display.
 - 6) Turn off the power switch.
 - 7) Insert the RAM card.
 - 8) Turn on the power switch.
 For further operation, follow the procedure of ordinary use.

6. CHECK PROGRAM

- This machine incorporates the self-diagnosis function shown in the flowchart of Fig. 1.
- 1) With or without 1MB ROM.
- 2) With or without RAM card.
- Check Flow

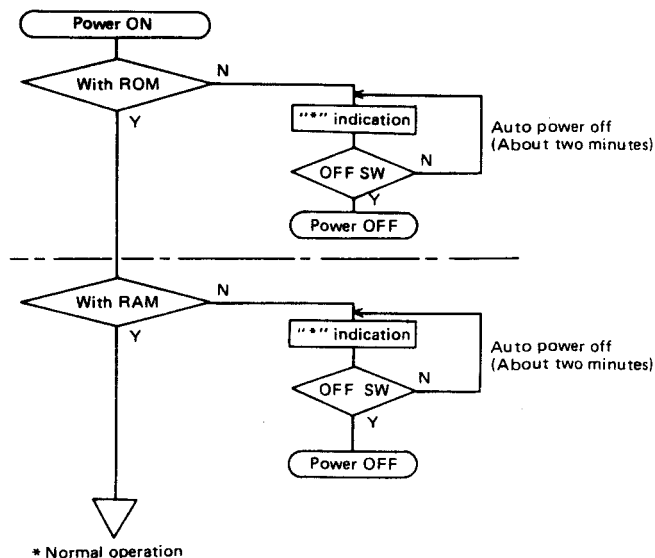


Fig. 1

*Normal operation

1. "0" is displayed when the RAM card is successfully operating.
2. "MEMORY ALL CLEAR OK?" is displayed when a fresh RAM card is used or the contents of the memory has been destroyed.
In this event, press the **[ENTER]** key, **[Y]**, or **[=]** key to clear the program and data within the RAM card.

© Checking I/O Circuit

Mount CE-126P onto 11 pin side and connect 15 pin SIO circuit with UKOGG0089CSZZ (service tools used for PC-1350) between PC-1425 each other for communication, then check the operation.

- SIO Circuit Check Program
(Test machine side)

(Program on the tested unit)

```

10: OPEN
20: FOR I=3 TO 127
30: B$=CHR$ I
40: INPUT #1A$
50: PRINT #1B$
60: WAIT 10: PRINT A$
70: NEXT I
80: CLOSE: GOTO 10
90: END

```

(Program on the testing unit)

```

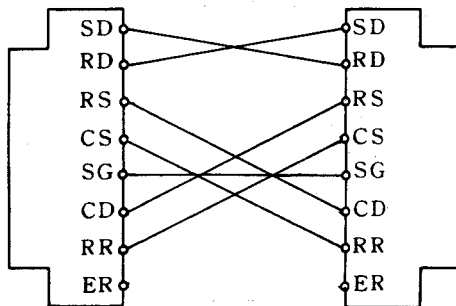
10: OPEN
20: FOR I=3 TO 127
30: A$=CHR$ I
40: PRINT #1A$
50: INPUT #1B$
60: WAIT 10: PRINT B$
70: NEXT I
80: CLOSE: GOTO 10
90: END

```

(Normal machine side)

Normal operation of SIO circuit is checked by executing the above program and by making sure that the same indication is repeated at both sides.

- Connection diagram of cable connectors (UKOGG0089-CSZZ)



7. LSI DESCRIPTIONS

SC61860A 31 microprocessor signal description

Pin No.	Signal name	In/Out	Description Standby = power off
1	A0	Out	Address bus line. High during standby.
2	R/W	Out	Write clock. Normally high.
3	ϕ AL	Out	Low order bit address latch. Normally high. Clock used to latch the low order 8 bits sent on the data bus line which is used in sending 16 bits address signal when using a large capacity ROM.
4	TES	In	Test pin. Normally low.
5	ϕ I	In	Oscillator input. (768 kHz)
6	ϕ O	Out	Oscillator output.
7	RES	In	Reset input. Reset when high. Normally pulled down to low level.
8	XIN	In	Cassette tape recorder option signal input (MTin).
9	KON	In	ON [BREAK] key input. Normally pulled down to low level.
10	XOUT	Out	Cassette tape recorder option and buzzer signal output (MTout1).
11	DIS	Out	LCD driver control signal.
12	HA	Out	LCD driver clock. Low during standby. 2KHz pulse generated during displaying.
13 ? 20	IA8 ? 1A1	In/Out ? In/Out	Key signal input/key strobe output signal. Low during standby. Pulse generated when key is pressed.
21	IB8	In	Data In (DIN) signal. Serial data input signal from the PCU (bit term serial handshaking).
22	IB7	In	Data input from option unit. DOUT
23	IB6	In	Data input from option unit. DOUT2
24	IB5	In	Data input from option unit. DIN2
25	IB4	In	SIO [RD]. Receive data.
26	IB3	In	SIO [CS]. Detection of send enabled from the other end.
27	IB2	Out	SIO [RS]. Sending of send request from this end. (buffered by gate alley).
28	IB1	In	SIO [CD]. Detection of a send request from the other end.
29	VM	In	LCD power supply.
30	VA	In	LCD power supply.
31	GND	In	Power supply (Battery ⊕ terminal)
32 ? 45	H1 ? H14	Out ? Out	LCD backplate signal. High impedance during standby. 4-level pulse during displaying.
46	H15	—	Not use.
47	H16	—	Not use.
48	VB	In	LCD power supply.
49	VDIS	In	LCD power supply.
50	VCC	In	LCD power supply. Low at all times.
51	VDC	Out	LCD power supply.
52	VGG	In	Power supply. Low at all times.
53 ? 60	O8 ? O1	In/Out ? In/Out	Data bus line. Normally high impedance. Data bus line. Normally high impedance.

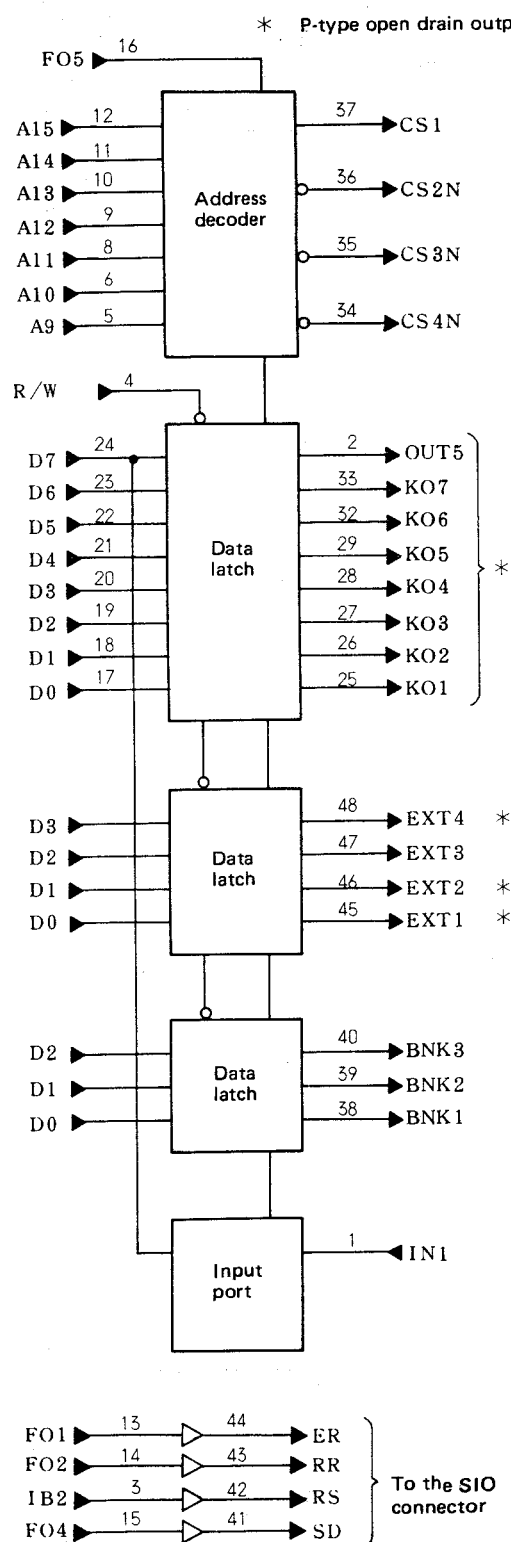
Pin No.	Signal name	In/Out	Description Standby = power off
61	FO5	Out	Memory chip enable.
62	FO4	Out	SIO [SD] . Transmit data. (buffered by gate alley).
63	FO3	Out	BUSY signal. Interface output port.
64	FO2	Out	SIO [RR] . Sending of receive enabled from this end. (buffered by gate alley)
65	FO1	Out	SIO [ER] . Goes high by the execution of OPEN command. Low during stand by (buffered by gate alley)
66 80	A15 A1	Out Out	Address bus line. High during standby.

LZ92K32 Gate Array Chip Signal Description

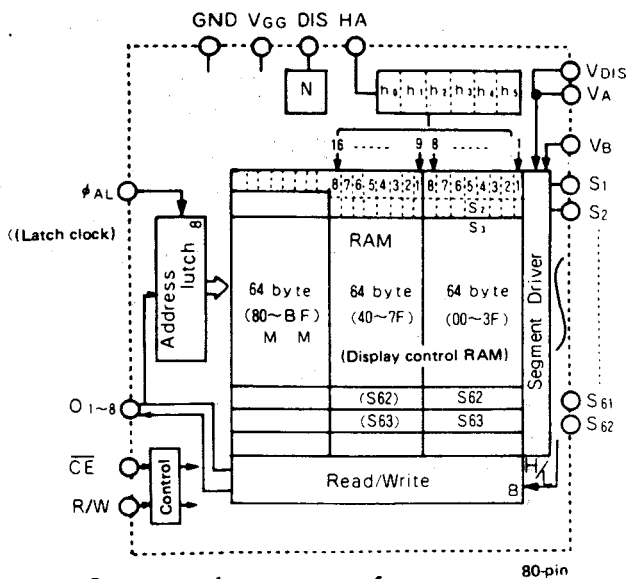
Pin No.	Symbol	In/Out	Description
1	IN1	In	Acknowledge signal. Enable the I/O (PCU) to read data from the CPU.
2	OUT5	Out	Japan/Export version selection signal line
3	IB2	In	SIO [RS] output from the CPU for send request, which is buffered in the gate array.
4	R/W	In	Write clock, normally high.
5	A9	In	Address bus
6	A10	In	Address bus
7	GND	—	Power supply ($\ominus$)
8	A11	In	Address bus
12	A15	In	Address bus
13	FO1	In	SIO [ER] output from the CPU that goes high with OPEN command, which is buffered in the gate array.
14	FO2	In	SIO [RR] output from the CPU that for receive enable, which is buffered in the gate array.
15	FO4	In	Input from the CPU for SIO [SD] transmit data.
16	FO5	In	Memory enable
17	D0	In/Out	Data bus
24	D7	In/Out	Data bus
25	KO1	Out	Key strobe output
26	KO2	Out	Key strobe output
27	KO3	Out	Key strobe output
28	KO4	Out	Key strobe output
29	KO5	Out	Key strobe output
30	VCC	—	Power supply ($\oplus$), GND connected
31	GND	—	Power supply ($\ominus$), GND connected
32	KO6	Out	Key strobe output
33	KO7	Out	Key strobe output
34	CS4N	Out	DISP LSI chip enable
35	CS3N	Out	System ROM 2 chip enable
36	CS2N	Out	System ROM 1 chip enable
37	CS1	Out	RAM card chip enable, active high.
38	BNK1	Out	ROM A14 signal
39	BNK2	—	ROM A15 signal
40	BNK3	—	ROM A16 signal
41	SD	Out	SIO [SD] and FO4 buffered transmit data
42	RS	Out	SIO[RS] and IB2 buffered send request
43	RR	Out	SIO [RR] and FO2 buffered ready to receive

Pin No.	Symbol	In/Out	Description
44	ER	Out	SIO [ER] and FO1 buffered signal which goes high with OPEN command.
45	EXT1	Out	Data output to option unit
46	EXT2	Out	Data output to option unit
47	EXT3	Out	Data output to option unit
48	EXT4	Out	Data output to option unit

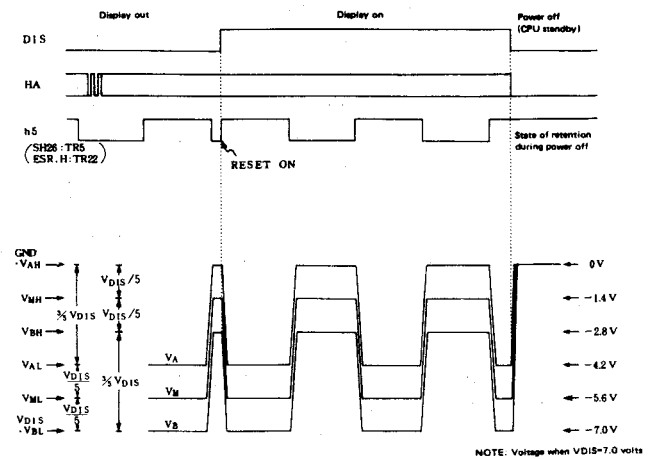
This LSI chip is used to decode various LSI (RAM, DISP) chip select signals and to buffer SIO output signals.



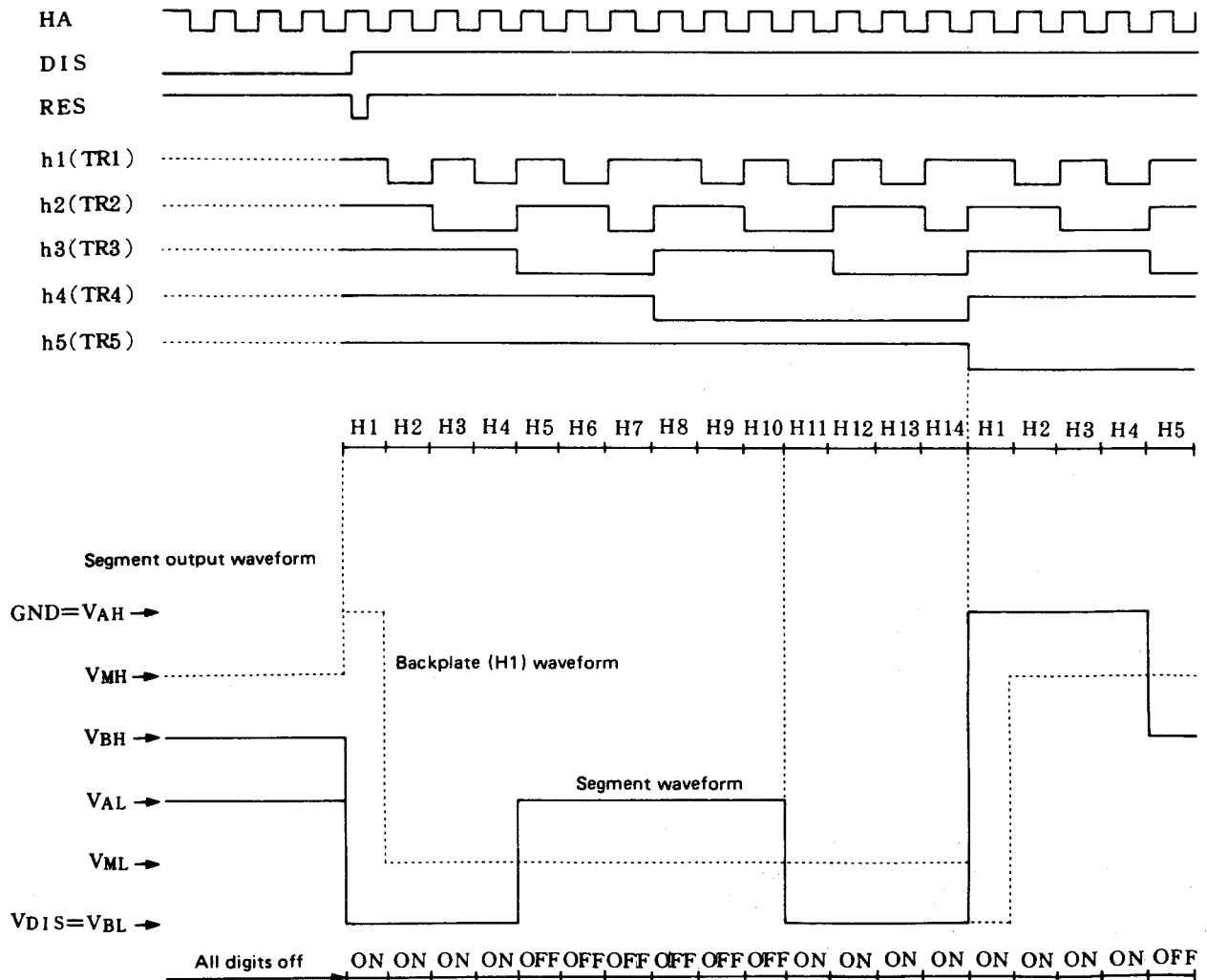
SC43536 Display LSI description



Timing



Counter and segment waveform



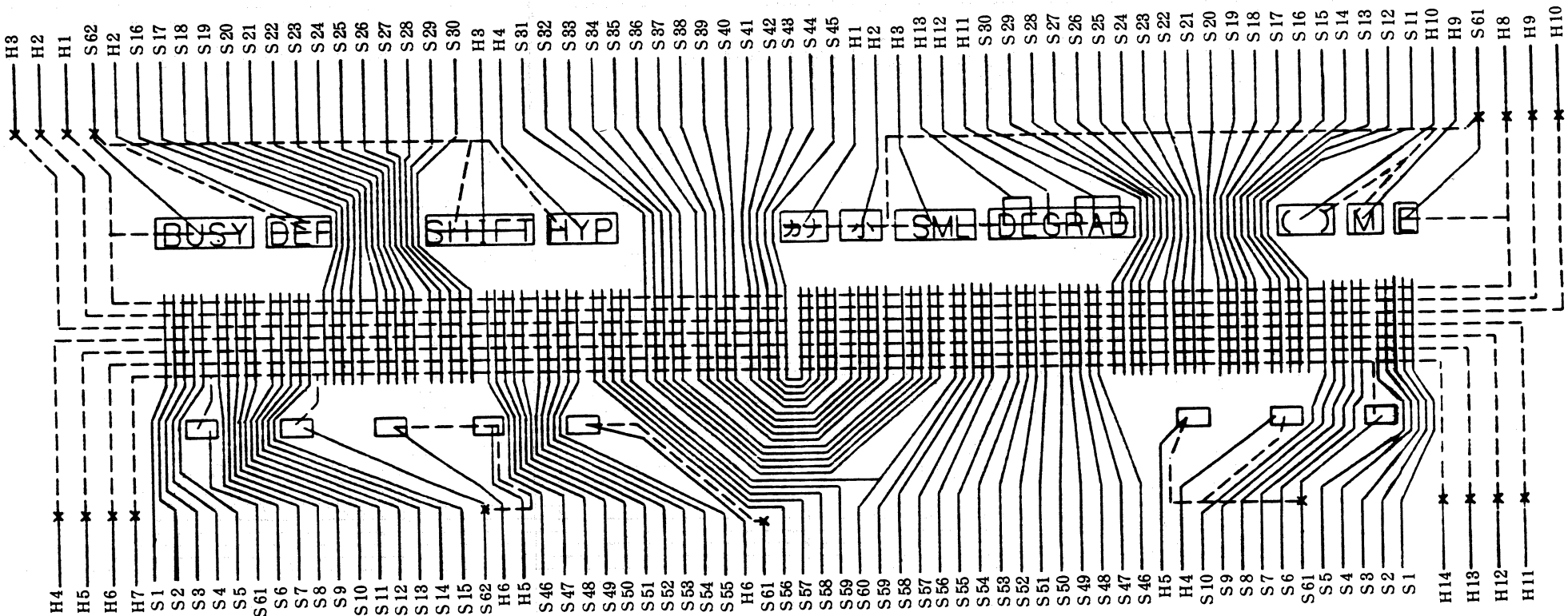
	h5 = 1	h5 = 0
All digits off (DIS = L)	V _{AL}	V _{BH}
On	V _{BL}	V _{AH}
Off	V _{AL}	V _{BH}

● SC43536 Display LSI Pin Description

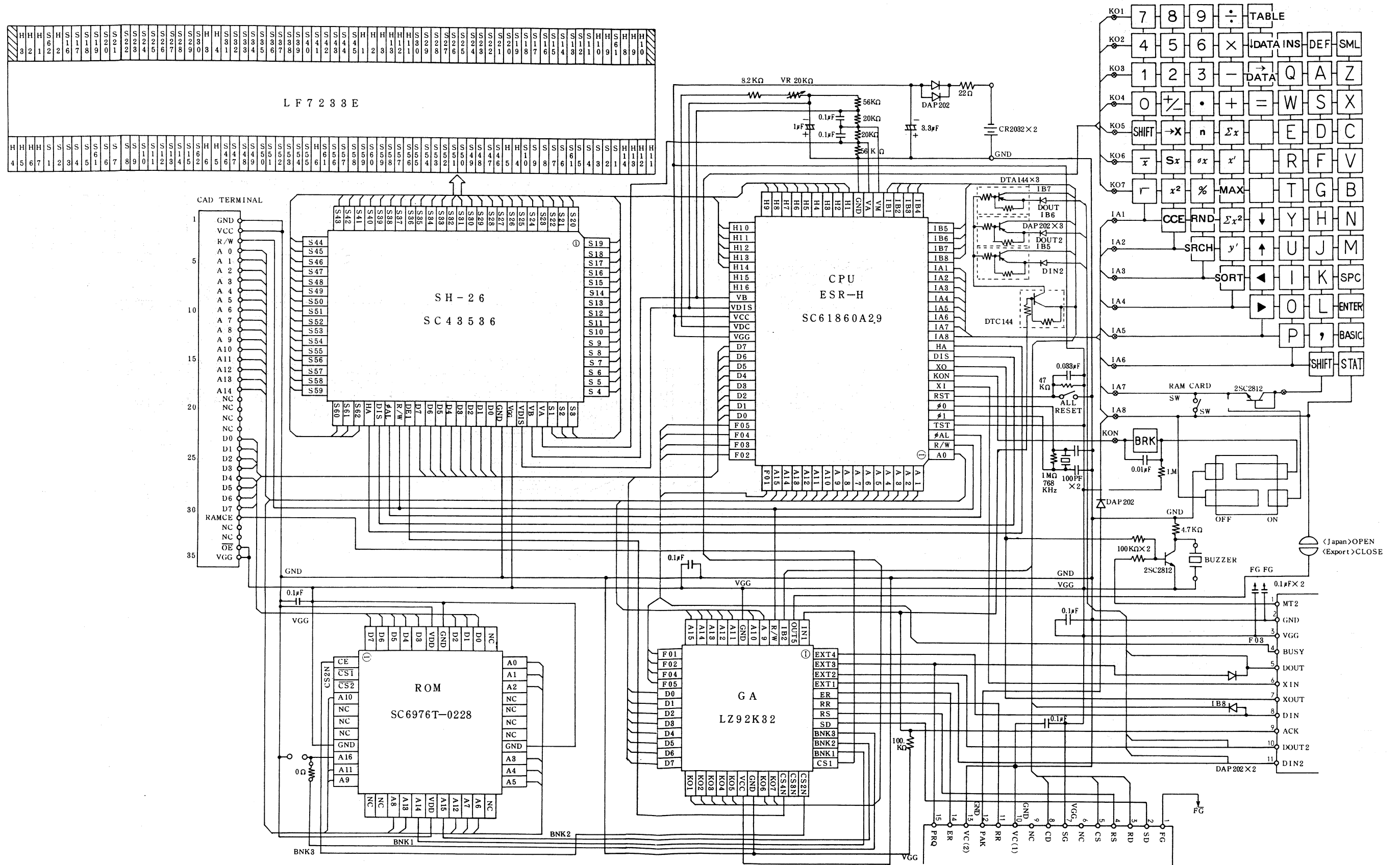
Segment and common signals

Display digit and symbol	Segment signal (from left)	Common signal (from above)
1st digit	S1 ~ S5	H1 ~ H7
2nd digit	S6 ~ S10	H1 ~ H7
3rd digit	S11 ~ S15	H1 ~ H7
4th digit	S16 ~ S20	H1 ~ H7
5th digit	S21 ~ S25	H1 ~ H7
6th digit	S26 ~ S30	H1 ~ H7
7th digit	S46 ~ S50	H1 ~ H7
8th digit	S51 ~ S55	H1 ~ H7
9th digit	S56 ~ S60	H1 ~ H7
10th digit	S31 ~ S35	H1 ~ H7
11th digit	S36 ~ S40	H1 ~ H7
12nd digit	S41 ~ S45	H1 ~ H7
13rd digit	S45 ~ S41	H8 ~ H14
14th digit	S40 ~ S36	H8 ~ H14
15th digit	S35 ~ S31	H8 ~ H14
16th digit	S60 ~ S56	H8 ~ H14
17th digit	S55 ~ S51	H8 ~ H14
18th digit	S50 ~ S46	H8 ~ H14
19th digit	S30 ~ S26	H8 ~ H14
20th digit	S25 ~ S21	H8 ~ H14
21st digit	S20 ~ S16	H8 ~ H14
22nd digit	S15 ~ S11	H8 ~ H14
23rd digit	S10 ~ S6	H8 ~ H14
24th digit	S5 ~ S1	H8 ~ H14
(CAL)	S62	H7
(RUN)	S62	H6
(PRO)	S62	H5
(STAT)	S61	H7
(PRINT)	S61	H14
BUSY	S62	H1
DEF	S62	H2
SHIFT	S62	H3
SML	S61	H3
DE	S61	H13
G	S61	H12
RAD	S61	H11
()	S61	H10
M	S61	H9
E	S61	H8

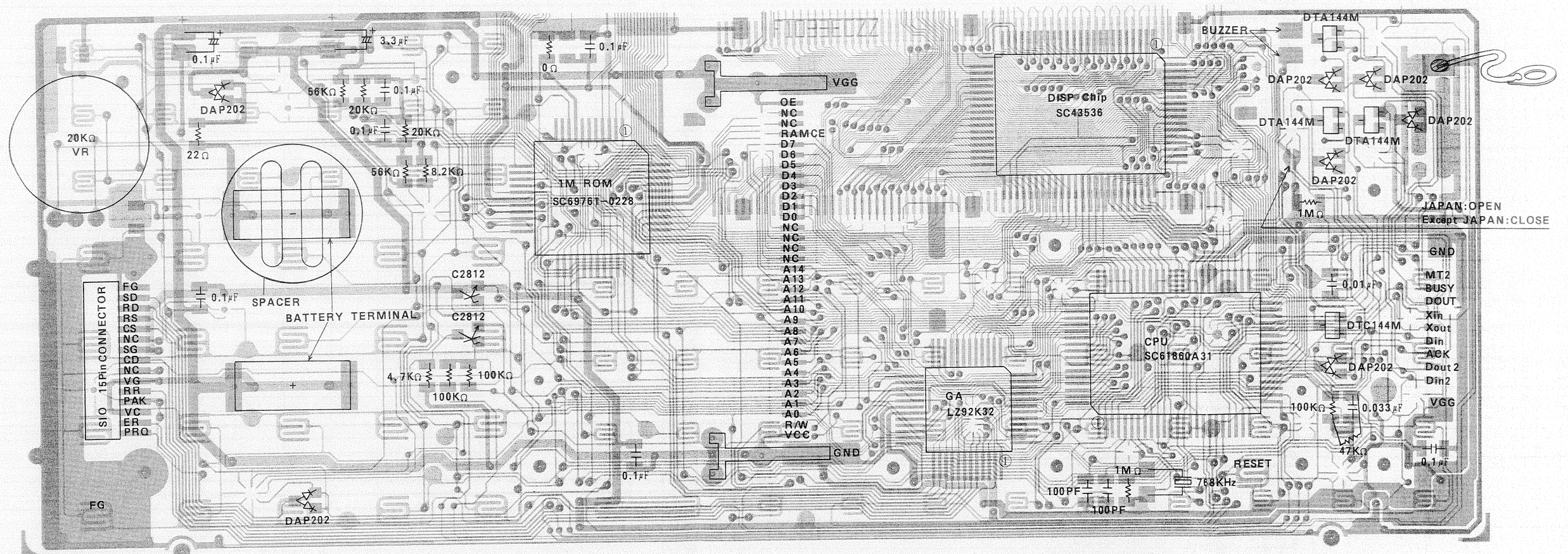
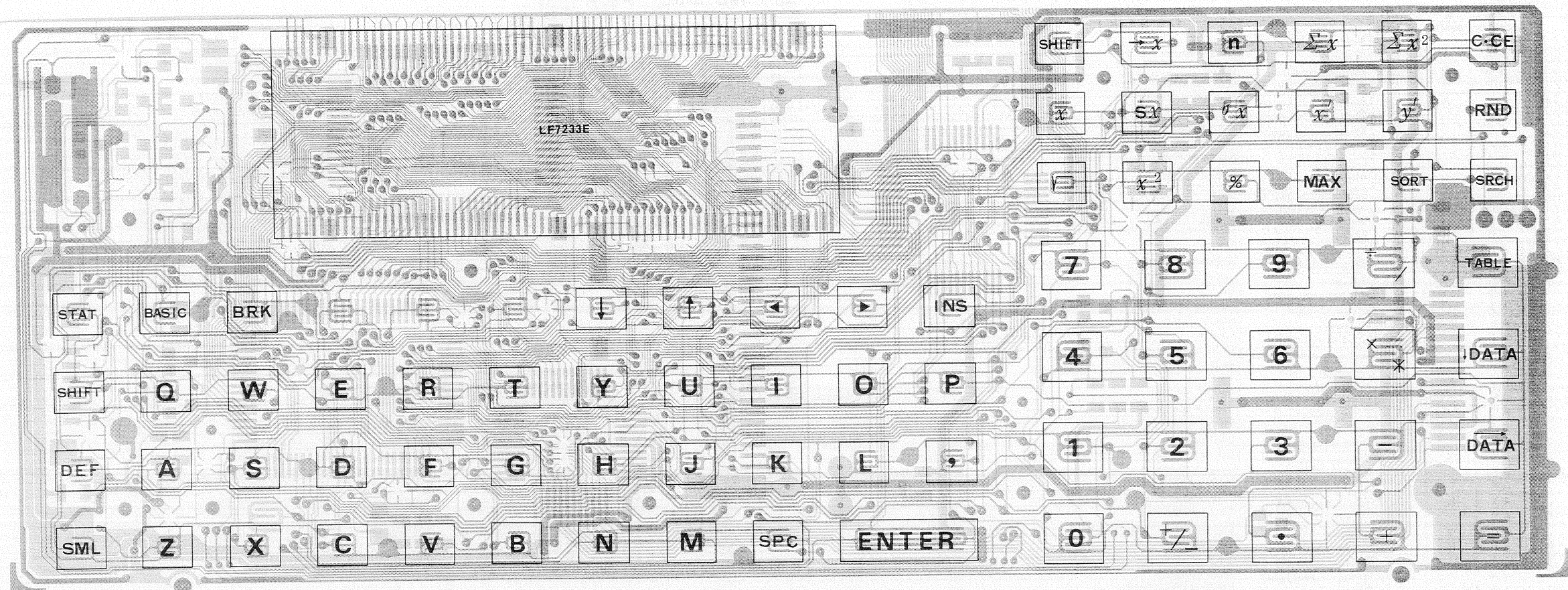
8. LCD MATRIX CIRCUIT



9. CIRCUIT DIAGRAM



10. PARTS & SIGNALS POSITION



11. PARTS LIST & GUIDE

1 Exteriors

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
1	GLEGG1031CCZZ	AA		C	Rubber foot
2	LX-BZ1192CCZZ	AA		C	Screw
3	LFIX-1190CCSB	AB	N	C	Card stopper
4	GCABA2808CCZD	AF	N	C	Bottom cabinet
5	MSLIP1040CCSB	AB	N	C	Slide switch knob
6	QCNTM1042CCZZ	AA		C	Slide switch terminal
7	PGUMM1594CCZZ	AB		C	Reset spring rubber
8	XUBSD20P04000	AA		C	Screw (2×4)
9	QLUGE1005CCZZ	AA		C	Lug terminal
10	LANGK1566CCZZ	AC		C	Angle
11	QCNCW1385CC1B	AH		C	Connector (12pin)
12	XUBSD20P10000	AA		C	Screw (2×10)
13	QPWBF1024ECZA	AC		C	Connector PWB (W/O parts)
14	MSPRC1294CCZZ	AB		C	Spring
15	PGUMS1010ECZZ	AB		C	Rubber connector
16	PTPEH1213CCZZ	AB		C	Tape for buzzer
17	RALMB1030CCZZ	AD		B	Buzzer
18	PGUMS1592CCZZ	AD		C	Rubber connector
19	XUBSF20P06000	AA		C	Screw (2×6)
20	LCHSS1171CCZZ	AE		C	Chassis
21	MSPRC1300CCZZ	AA		C	Card cover spring
22	QTANZ1406CCZZ	AB		C	Battery terminal (⊕⊖)
23	QTANZ1493CCZZ	AA		C	Terminal
24	DUNTK1108ECZZ	BP	N	E	PWB unit (Include No.9,11,13,25,27)
25	QCNCW1368CC1E	AM		C	Connector (15pin)
26	PGUMS1494CCZZ	AC		C	Fixing rubber
27	DUNT-1093ECZZ	AS		E	LCD unit
28	PGUMM1587CCZZ	AH		B	Rubber spring
29	PSLDP1015ECZZ	AB	N	C	Display mask
30	PFILV1544CCZZ	AC		B	Polarized filter
31	MSLIP1020CCSA	AB		C	Slide switch A
32	DUNTG1153ECZZ	AX	N	D	Top cabinet unit
35	GFTAA1287CCSB	AB		D	Connector (15pin)
36	TLABM1047ECZZ	AB	N	C	Spc.label
37	GFTAU1309CCSB	AF	N	D	Lid for card
38	TCAUK1242CCZZ	AA		C	Caution label
39	TLABZ2240CCZZ	AA		C	Battery cover label
40	PCUSS1266CCZZ	AA		C	Reset switch cushion
41	NJIK-1002CCZZ	AA		C	Spring shaft
42	LSTPP1022CCZZ	AC		C	Card stopper
43	MSPRC1297CCZZ	AB		C	Card stopper spring
44	JKNBZ1943CCSC	AG	N	C	Key top (Numeral keys 1set)
45	JKNBZ1873CCSF	AF	N	C	Key top (Alphabet keys 1set)
46	JKNBZ1909CC01	AF		C	Key top (SHIFT key 48pcs/1set)
47	JKNBZ1874CCSA	AF	N	C	Key top (STAT key 48pcs/1set)
48	JKNBZ1874CC01	AF		C	Key top (BASIC key 48pcs/1set)
49	JKNBZ1908CCSD	AF	N	C	Key top (DEF key 48pcs/1set)
50	JKNBZ1908CCSE	AF	N	C	Key top (SML key 48pcs/1set)
51	JKNBZ1916CC03	AF		D	Key top (C-CE key 48pcs/1set)
52	JKNBZ1908CCZC	AG	N	C	Key top (Function keys 2set)
53	JKNBZ1908CCZE	AF	N	C	Key top (INS key 48pcs/1set)
54	TLABH1050ECZZ	AA		D	Protection plate label
55	PHOG-1106CCZZ	AK		C	Protection plate
56	TLABH1955CCZZ	AB		C	Operation label

2 PWB unit

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
1	DUNT-1093ECZZ	AS		E	LCD unit
2	MSPRC1277CCZZ	AA		C	Connector spring (for 15pin connector)
3	PZETL1313CCZZ	AA		C	Spacer for battery terminal(Round)
4	QCNCW1368CC1E	AM		C	Connector (15pin)
5	QCNCW1385CC1B	AH		C	Connector (12pin)
6	QLUGE1005CCZZ	AA		C	Lug terminal
7	QPWBF1024ECZA	AC		C	Connector PWB (W/O parts)
8	QTANZ1289CCZZ	AB		C	Battery terminal
9	VCTYPU1NX104M	AB		C	Capacitor (12WV 0.10μF)
10	RC-CZ1021CCZZ	AB		C	Capacitor (0.1μF)
11	RC-CZ1035CCZZ	AC		C	Capacitor (100pF)
12	RC-CZ1037CCZZ	AB		C	Capacitor (0.01μF)
13	RC-CZ1047CCZZ	AB		C	Capacitor (0.033μF)
14	RC-SZ1007CCZZ	AF		C	Capacitor (1μF)
15	RC-SZ1021CCZZ	AC		C	Capacitor (10WV 3.3μF)
16	RCSRZ1063CCZZ	AF		B	Crystal (768KHz)
17	RH-TX1012CCZZ	AC		B	Transistor (2SC2812)
18	RVR-Z2400QCZZ	AF		B	Variable resistor (20KΩ)

2 PWB unit

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
19	VHDDAP202K/-1	AB		B	Diode (DAP202K)
20	VHILZ92K32/-1	AN		B	IC (LZ92K32)
21	VHISC43536/-1	AX		B	IC (SC43536)
22	VHISC61860A31	AY		B	IC (SC61860A31)
23	VHISC69760228	AX	N	B	IC (SC69760228)
24	VRD-HT2EY473J	AA		C	Resistor (1/4W 47KΩ ±5%)
25	VRS-TP2BD000J	AA		C	Resistor (1/8W 0Ω ±5%)
26	VRS-TP2BD104J	AA		C	Resistor (1/8W 100KΩ ±5%)
27	VRS-TP2BD105J	AA		C	Resistor (1/8W 1.0MΩ ±5%)
28	VRS-TP2BD203J	AA		C	Resistor (1/8W 20KΩ ±5%)
29	VRS-TP2BD220J	AA		C	Resistor (1/8W 22Ω ±5%)
30	VRS-TP2BD472J	AA		C	Resistor (1/8W 4.7KΩ ±5%)
31	VRS-TP2BD563J	AA		C	Resistor (1/8W 56KΩ ±5%)
32	VRS-TP2BD822J	AA		C	Resistor (1/8W 8.2KΩ ±5%)
33	VSDTA144EK/-1	AC	N	B	Transistor (DTA144EK)
34	VSDTC144EK/-1	AC		B	Transistor (DTC144EK)
901	DUNTK1108ECZZ	BP	N	E	PWB unit

3 Packing material & Accessories

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
1	GCASP1105CCSC	AF		D	Hard case
2	LPLTP1119CCZZ	AB		C	Tem plate
3	TINSG1089ECZZ	AX	N	D	Instruction book (Germany)
3	TINSE1088ECZZ	AZ	N	D	Instruction book (Except Germany)
4	SPAKA048ACCZZ	AA		D	Protection pad
5	SPAKC0212ECZZ	AH	N	D	Packing case (Except Canada)
5	SPAKC0209ECZZ	AQ	N	D	Packing case (Canada)
6	SPAKA8802CCZZ	AD		D	Packing cushion for set
7	TLABH1068ECZZ	AC	N	D	Operation label

